

## THE HISTORY OF PLANT BREEDING

### Survival was a full-time job

Early humans lived as hunter gatherers, following the plants and animals they fed upon. **Survival was a full-time job.**

Around 10,000 years ago, the first wild plant species were brought under human management. This is referred to as **domestication**. Slowly nomadic groups of people set down permanent roots and agricultural systems were born.

### I KNOW CORN. THAT ISN'T CORN.

In Mexico, farmers harvest a wild grass called teosinte to feed their livestock. Broad-leaved and about two metres tall, it makes great forage. It's also self-seeding, since its stony seeds can survive unscathed right through a cow's digestive tract.

Thousands of years ago, farmers discovered teosinte with soft-shelled seeds, six to a dozen per set, that were good to eat. They started replanting this teosinte and over many years, added varieties with more than one row of seeds.

Today, the great, great grandchild of this Mexican grass can have cobs 30 centimetres long, each carrying more than 500 seeds. It is corn, one of the most important crops in the world.

### CHOOSING THE BEST

During the long period of prehistoric and historic cultivation, humans knowingly and unknowingly practiced selective breeding. Early farmers chose to save seeds from plants with juicy fruit or the plants with seeds that didn't pop off quickly. As people moved across the world, they brought cultivated plant species with them.

### The father of modern genetics

Our modern understanding of how traits may be inherited comes from **three principles of inheritance** proposed by Gregor Mendel in 1865.

- 1 that inheritance of each trait is determined by "units" that are passed on to descendants unchanged (now called genes)
- 2 that an individual inherits one such unit from each parent for each trait
- 3 that a trait may not show up in an individual but can still be passed on to the next generation.

### Summer is too short



Settlers on the Canadian Prairies found fertile soil but a fairly short growing season. In the late 1880s, a variety of wheat called Red Fife had good yields but often got hit by autumn frosts. William Saunders of Canada's Experimental Farms Service crossed Red Fife with an early maturing but low yielding variety called Hard Red Calcutta.

Saunders chewed a few kernels from each wheat he was testing to make a dough ball. A springier ball meant good levels of gluten – essential to making a soft, high-rising bread loaf.

When he was satisfied, he had his new variety: Marquis. It would go on to help make the Prairies the breadbasket of Canada.





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## SWEET SUCCESS

Quebec settlers began growing apples in the early 1600s. Over the years, both farmers and plant breeders have developed iconic varieties.

In the early 1800s, Ontario pioneer John McIntosh discovered a sapling on his land and planted it in his garden, giving rise to the McIntosh apple. Another variety, the Spartan, was borne of research at Agriculture and Agri-Food Canada's Summerland Research Centre in British Columbia. There are now dozens of apple varieties grown across Canada.

Plant breeders search the world to develop new apples with traits such as texture, taste and resistance to disease and pests. The Apple Diversity Group at Nova Scotia's Dalhousie University maintains more than 1,000 varieties.



## DIFFERENT VEGGIES, ONE SPECIES

Plant breeders look at similar plants to produce varieties with traits they want. One variety may have edible flowers, another edible leaves or a tasty edible bulb. Selecting for these traits has given us broccoli, cauliflower, cabbage, Brussels sprouts, kale and kohlrabi – all varieties of the single species, *Brassica oleracea*.



## LIMITS OF PLANT BREEDING

Plant breeding has created most of the food crops that feed us today. But it has limits. For one thing, the trait you want might not exist in the crop or any of its cousins. The less related the plants, the harder it is to cross them. If plants aren't related, it's impossible.

Even when you find a trait you want, in a plant closely related enough to work with, you must slowly breed out the undesirable traits that come along for the ride. It's a process that can take many years, which is why scientists have developed advanced breeding techniques. Learn more on the Advanced Breeding snapAG sheet.

